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AUTHOR Randolph, W. Alan; DeNisi, Angelo S.
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ABSTRACT

Past research has suggested that reliance upon implicit theories may depend upon the ambiguity or salience of provided cues. Previously unexplored factors were investigated to further an understanding of implicit theories related to group processes, by: (1) utilizing a no feedback control group in addition to high and low feedback groups; (2) measuring actual and questionnaire effects for a second task subsequent to feedback; and (3) utilizing group interaction ratings by both independent observers and subjects. Results from a laboratory experiment involving 143 subjects in 2 tasks, with feedback after the first task, supported the concept of implicit theories of performance and their effect on survey responses; however, the process by which the theories operated appeared to be much more complex than past research had suggested. Implicit theories of performance seemed to operate only under certain conditions and for limited periods of time, i.e., when performance cues were strong and little additional information was available, their effects on subsequent task behavior and related surveys were minimal. Immediately after feedback, observer ratings of interaction and feedback condition shared the explained variance for subject ratings of interaction. Following another task, observer ratings were better predictors of subject ratings. (Author/NRB)

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EXTENDING THE STUDY OF
IMPLICIT THEORIES AND THEIR
IMPACT ON QUESTIONNAIRE RESPONSES¹

by

W. Alan Randolph

Angelo S. DeNisi

College of Business Administration
University of South Carolina

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Address Correspondence to:
W. Alan Randolph
College of Business Administration
University of South Carolina
Columbia, SC 29208
(803) 777-6499

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EXTENDING THE STUDY OF
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When Staw (1975) concluded that subjects in his study were relying upon performance feedback information to evaluate group processes, he signaled the beginning of a series of studies and some controversy. In that study, Staw found 12 out of 17 significant differences between ratings of such variables as communications, cohesiveness, influence and motivation, obtained from members of groups receiving positive or negative feedback on an ambiguous task. That is, members of groups who received positive feedback rated their groups and fellow group members in significantly more positive terms than members of groups who received negative feedback, even though all feedback was false and there were no real performance differences between the two conditions. The implications of these results are considerable, as they raise questions about the validity of any perceptual measures collected in field settings, and the seriousness of this issue spurred several other studies.

In the first of these, DeNisi and Pritchard (1978) attempted to address the issue of information availability relative to Staw's (1975) results. They argued that, since Staw's groups had no prior history and worked together for only 30 minutes, it was only logical that they should rely upon the salient feedback cue to derive their ratings, as this was the only real "cue" available. DeNisi and Pritchard (1978) also based their arguments upon the results of a sometimes overlooked second

experiment reported in the Staw paper. In that second experiment, subjects were simply given the overall performance of groups performing the same task as in the first experiment, and were asked to estimate cohesiveness, motivation, etc. in those groups. These subjects, though, did not actually perform the task themselves, and so could rely only upon the performance cues. The fact that the differences between ratings for "high and low" performance groups were much stronger in this experiment, seemed to support the hypothesis that lack of information was a major factor in explaining Staw's results. In fact, DeNisi and Pritchard found that allowing groups to work together on two tasks before working on a truck routing problem for which they received false feedback, virtually eliminated the differences found by Staw (1975). They found a significant difference between feedback conditions for only one item -- motivation.

Downey, Chacko, and McElroy (1979), however, questioned this argument that prior work history alone could eliminate reliance upon performance cues. In a subsequent study, they utilized the same Financial Puzzle exercise used by Staw to test the effects of history. When comparing ratings obtained from work groups with 12-weeks prior work history to ratings from groups with no history, they found only 5 of 17 significant differences on Staw's items. They also found no significant effects for a history x sign of feedback interaction. On the other hand, they found results comparable to Staw's when comparing high vs. low feedback conditions. Still, the fact that they found weak evidence of a main effect for history allows for the possibility that high and low feedback groups with prior work

history may have exhibited fewer significant differences than the no history groups. It would seem, then, that the issue of information availability and reliance upon implicit theories remains unsettled.

Another recent study (Binning and Lord, in press) criticizes the DeNisi and Pritchard study in a different area. They note that, since DeNisi and Pritchard did not manipulate feedback on the first two tasks, subjects probably received inconsistent feedback across the three tasks, thus weakening the strength of the cues available. Binning and Lord essentially replicated the DeNisi and Pritchard design, but provided feedback after each of three tasks performed, and found 12 of 17 significant differences between groups receiving consistently good and consistently poor feedback. They argue that, since familiarity among group members was identical to the groups in the DeNisi and Pritchard study, the differences were due to the consistency of the feedback, which translates to the strength of the performance cues.

It is interesting to note, however, that Binning and Lord found virtually no differences in the responses of groups receiving positive feedback on two of three tasks and those receiving negative feedback on two of three tasks (although responses did vary as a linear function of the amount of positive feedback). It may be that feedback consistency is a critical condition for Staw's original effects, with any variance in performance feedback drastically reducing effects. This might suggest

that only groups who have consistently experienced success or failure in the past are prone to reliance upon implicit theories. But such groups are rare, and if their performance was that consistent over time, it would be hard for group members to discount past performance in responding to any questionnaire. Indeed, this reliance on consistently good (poor) feedback conforms to the argument that subjects will rely upon the strongest cues available in making evaluations. If performance feedback is consistent and compelling, it will be utilized, but as it becomes more ambiguous, subjects may well turn to other sources of information.

Another study (Schriesheim and DeNisi, Note 2) directly manipulated the amount of information available to subjects asked to describe the behavior of a fictitious leader. "True" descriptions of the leader, based on the information provided, were compared with subjects' descriptions, and predictably, accuracy was found to be a function of the amount of information available, with subjects relying upon stereotypes only when little other information was available.

Considering the results of these studies, then, it would seem that reliance upon implicit theories, or stereotypes is not an "all-or-nothing" phenomenon. That is, people may use all sources of information available--true information and "information" from implicit theories. Relative reliance upon these two may depend upon the ambiguity and/or salience of the cues provided. In order to better understand these processes, however, several factors which have not been considered in previous research, need to be taken into account. For example, in order to appreciate the strength of an implicit theory operating in relation to group process variables, we need to utilize a no-feedback control group to provide a basis of comparison. To date, the only implicit theories studies employing no-feedback control groups have related to

leadership questionnaires (Rush, Thomas and Lord, 1977; Lord, Binning, Rush and Thomas, 1978). Furthermore, an independent, and hopefully more objective, measure of group processes during a task would allow us to assess differences in responses between feedback groups not based on true differences between the groups. (That is, even if performance is the same, group processes could differ.) In the past, studies of implicit theories have focused only on differences in performance cues as predictors of group process ratings, but actual process is also an important predictor variable to be considered. Finally, some type of follow-up information would be useful. Although feedback cues may affect immediate responses of subjects, we need to determine if they also affect subsequent interactions among group members and subsequent survey responses. None of these issues has been addressed in previous research on implicit theories and group processes. The present study will attempt to shed more light on the area of implicit theories as related to group process by (1) utilizing a no feedback group, (2) collecting independent measures of group activities, and (3) measuring actual and questionnaire effects for another task following feedback.

Research Questions

The present study, then, was designed to address three research questions that have not been previously addressed:

- (1) What differences in survey responses on group process will result among high, low, and no feedback groups? If the strength of performance cues is important we should find weaker effects when comparing either high or low feedback groups with groups receiving no feedback, than when we compare high and low feedback groups directly.

- (2) How will feedback (performance cues) from one task affect survey responses, behavior, and actual performance on a subsequent task? Downey, et al. (1979) would seem to suggest that the feedback effects will be the same for surveys (and perhaps behavior and performance) following a subsequent task as for surveys immediately following feedback, since all we have done is provide a more recent "history" for the groups.
- (3) What is the nature of the relationship between objective measures of group processes and self-reported measures of group processes following feedback? The answer to this question would get to the heart of the implicit theories issue by assessing the relative impact of "true" behavior and feedback on questionnaire responses.

In addition, the present study will incorporate several attribution items to be completed by subjects after receiving feedback. Previous research in the area of implicit theories has not really considered attributions as a dependent variable, but in addition to using performance cues to actually form evaluations, subjects should use performance cues to adjust attributions. Specifically, we would expect subjects receiving negative feedback cues to attribute their performance more to external rather than internal factors, while the reverse should be true of subjects receiving positive cues. This portion of the study, however, is exploratory.

Method

Subjects and Procedures

Subjects in the present experiment were 143 undergraduate psychology students (36% female). The 36 groups utilized consisted of 3 to 5 people each, depending upon the number of subjects reporting at the assigned time. Upon arrival, subjects were told they would be performing two group problem solving tasks as part of a study of how groups solved problems. They were informed that they would be observed by two raters from behind a one-way glass in order to obtain independent measures of group processes during the tasks.

Subjects then began working on the truck routing task developed by DeNisi and Pritchard (1978). The task was to determine the best route between Wichita, Kansas and either Richmond or San Francisco for maximizing points gained by picking up cargo in designated cities. The trip could not exceed 5000 miles. Subjects were provided with a map, a mileage chart and a list of points assigned to various cities. Upon completion of this task (30 min. maximum) half of the subjects immediately completed a questionnaire which contained a number of Staw's (1975) items plus items on group process and attributions (described below). They then received bogus performance feedback. The other half of the subjects received the bogus performance feedback first and then completed the same questionnaire. The bogus feedback consisted of comparing their point totals with a set of bogus norms that placed the group in either the top or bottom 25th percentile; no one questioned the feedback. As a manipulation check, all subjects were asked to rate their performance on the task.

Following a short break, the subjects began work on the second task. This task was identical to the first task except that the route now had to terminate in either Miami or Seattle, and cities along the way were assigned different point values. The same 5000 mile constraint was in effect. After 30 minutes to work on the task, subjects were asked to again complete the survey without any additional feedback. They were then told the experiment had ended and debriefed in great detail.

Experimental Manipulations

There existed two experimental manipulations. One was whether the groups received feedback before or after completing the questionnaire after the first task. The second manipulation related to the nature of the feedback. Groups were randomly assigned to either a high or low feedback condition. Upon completion of the first task, and either before or after questionnaire completion, the experimenters went to each group to "score" their solution. The experimenter would quickly note the group's point total and ask subjects to remind him of the mileage constraint for their group (5000 miles for all groups). The point total was then compared to a form with a set of bogus norms, supposedly based on the mileage constraint, but actually designed to allow assignment to either the top or bottom 25th percentile. This was done in plain view of everyone and no one questioned the feedback. The average self-rated

performance for the high feedback groups was 6.01 on a 7-point scale, whereas the average for the low feedback groups was 5.16 and the average for the no-feedback groups was 5.89. An analysis of variance of these ratings indicates a significant feedback effect ($p \leq .01$). The differences between high and low and between low and no feedback groups ($t = 5.92$ and 5.70 , respectively) are highly significant ($p \leq .01$), and the difference between the high and no feedback groups is significant ($t = 2.26$, $p \leq .05$). These results suggest that the feedback manipulation was successful, especially since there were no significant differences among these conditions in terms of actual performance.

Measures

In selecting measures, it was decided to include several of Staw's items that have supported an implicit theories explanation, but to utilize multi-item measures of group process in order to allow an assessment of reliability. The questions on attributions and perceived performance were chosen from previously published work. All items are described in more detail below.

1. Eight items used by Staw (1975) were employed: those dealing with motivation, influence, use of difference ideas, and conflict. These eight were selected because they have consistently suggested an implicit theories impact. Since the two motivation items were highly correlated, they were averaged to form a single measure of motivation. The same was true for the two conflict items. The internal consistency of the motivation measure was calculated (coefficient alpha) to be .92 after the first task (T1), and .90 after the second task (T2). The conflict measure was found to have internal consistence of .77 at T1 and .71 at T2. The other four items were treated as single item measures. All ratings were made using 7-point scales.

2. Group process was measured using several self-report measures. A two-item, 7-point measure of group member's feelings toward one another (Finch, Jones, and Litterer, 1976) exhibited internal consistency (coefficient alpha) of .83 and T1 and .87 at T2. A 7-item, 7-point measure of group interaction (Randolph and Youngblood, Note 1) addressed the exchange of information in the group and the participation of group members. Its internal consistency was .82 at T1 and .82 at T2.

Finally, the twelve items from Bales (1950) Interpersonal Process Analysis (IPA) form were cast in a 7-point (agree to disagree) self-rating framework (e.g., "group members tended to give suggestions and directions to one another"). Based on Bale's conceptual framework, the IPA questions were aveaged in sets of three items to form four measures: positive reactions, attempted answers, questions asked, and negative reactions. The internal consistency of the four measures were .76, .74, .92, .66 and T1 at .69, .86, .91, .69 at T2, respectively.

3. Group process was also rated by two independent and naive-to-the conditions raters, using the Bales (1950) Interpersonal Process Analysis observer form. While observing the groups they kept a tally of group behavior falling into each of the twelve categories. Afterwards, they used their judgment to convert these tallies into ratings on 7-point scales, for ease of comparison with the subjects' perceptions. Again the items were averaged based on Bales' conceptual framework to form measures for the four categories: positive reactions, attempted answers, questions asked, and negative reactions. The average interrater reliability for the four categories across the two tasks was .54, and Bales (1950) suggests that .50 is acceptable for this instrument.

4. Attributions for group performance were assessed for the following seven "causes": my ability, group ability, my effort, group effort, luck, nature of task, and clarity of instructions (representing different categories discussed by Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum, 1971). Each "cause" was assessed on a 7-point scale ranging from "not at all responsible" to "almost completely responsible".

5. Perceived performance was measured by two items asking subjects to rate the group on a 7 point scale and asking subjects to give the group a letter grade (A, A-, etc.), which was then converted to a numerical scale (DeNisi and Pritchard, 1978). These two scores were then averaged to provide one measure of perceived performance. Coefficient alpha for this measure was .83 at T1 and .84 at T2.

6. Objective performance was taken to be the number of points a group collected on each of the truck routing tasks.

Method of Analysis

In order to address the first research question, it is necessary to divide the sample into high, low, and no feedback groups. That is, only half the total sample will receive feedback before completing the questionnaire measures. Responses of subjects receiving high and low feedback will be compared with responses of subjects who complete the questionnaire before receiving any feedback. A one-way analysis of variance (ANOVA) utilizing three feedback levels (high, low, no) will be performed for each questionnaire item and will be followed by t-tests comparing high vs. low, high vs. no, and low vs. no feedback conditions.

In order to address the second question, the sample will be divided

into high and low feedback groups, since all groups will receive feedback on task 1 before beginning task 2. Questionnaire data, as well as the observer data, will be compared for these groups following the second task, before any additional feedback is given. In order to control for any differences occurring during the first task, a series of analyses of covariance (ANCOVA) will be conducted with task 2 data as dependent variables, and task 1 data as covariates. The actual analyses will be 2-way ANCOVA's, considering both the order of feedback after the first task (before or after completing the questionnaire), and the nature of that feedback (high or low).

Finally, in order to address the third question, a series of multiple regression equations will be constructed to predict self-report Bales ratings after tasks one and two, using observer Bales ratings and type of feedback as predictors.

Results

Comparison of Feedback Conditions

In order to assess the differences in questionnaire responses among high, low and no feedback groups following task 1, a series of one-way ANOVA's were conducted for each questionnaire measure. Significant effects for feedback condition ($p < .05$) were found only for "quantity of ideas" and attributions to "my ability" in addition to ratings of perceived performance (manipulation check). To better understand the nature of these effects, a series of t-tests were also conducted comparing mean responses obtained from high, low, and no feedback groups on each measure. These means, and the results of the t-tests, are presented in Table 1.

Table 1 Goes About Here

As shown in Table 1, the differences in perceived performance among the three feedback conditions were significant, and supported the effectiveness of the feedback manipulation, while there were no significant differences in objective performance. In addition, there were few differences between conditions for the observer ratings of interaction. Comparing the low and no feedback groups there were no significant differences in survey responses, while the high and no feedback conditions differed significantly only on ratings of quantity of ideas and attributions to individual ability, with the high feedback groups indicating higher levels on both measures.

Further, the high feedback groups' responses were higher than the low feedback groups on 16 of 19 measures, but the differences were significant on only 5 of 19 measures, and four of the five related to attribution. High feedback groups attributed their "success" to internal factors (self and group ability) to a significantly greater extent than did low feedback groups, but made significantly weaker attributions to external factors (luck and the nature of the task). The fifth significant difference related to group processes ("attempted answers" from the modified Bales' instrument), and high feedback group members perceived more frequent attempted answers in their groups than did the members of low feedback groups. Two other measures, perceived interaction of the group and questions asked, also exhibited higher levels for the high feedback groups ($p < .06$). Support for the operation of implicit theories is strengthened if one compares these differences in subject-rated Bales items with the differences in observer-rated Bales items. The observers rated the low groups higher on three of the four measures, whereas the subjects rated the high groups higher on three of the four measures.

Thus the results do provide some support for the operation of implicit

theories in determining questionnaire responses, and the results of the present study point to strong effects in the area of attributions for performance -- an area not previously considered in the context of implicit theories. Also, the fact that there were more differences between high and low feedback groups than between groups in either the high or low condition and the no feedback condition provides further support for the operation of implicit theories only in the presence of strong performance cues (Binning and Lord, in press). Next, we consider what happens with additional information provided after the strong performance cues; i.e., what happens on surveys following additional tasks.

Feedback Effects for a Subsequent Task

In order to address the second research question regarding implicit theory effects on subsequent tasks, a series of two-way ANCOVA's (sign of feedback X order of feedback) was conducted for each dependent measure following the second task. Time 1 data served as a covariate. The results of these analyses revealed no main effects for the order of feedback, several main effects for sign of feedback, and no interaction effects.

However, since the feedback was given only after the first task, there was some concern that the ANCOVA analysis might have removed the feedback effects from the time 2 data. Hence, a two-way ANOVA was also run and compared with the ANCOVA analysis. The results were identical in the two analyses. Thus, since there were no order effects and no interaction effects, the groups were collapsed and a series of t-tests was conducted comparing responses of high and low feedback conditions after the second task (without adjusting for time 1 responses). Recall that all groups had received feedback before beginning the second task and that time 2 questionnaires were completed

before any additional feedback was given. The results of these t-tests are shown in Table 2, along with the means for the two feedback conditions(also unadjusted).

Table 2 Goes About Here

As shown in Table 2, the high feedback group scored higher on only 9 of the 19 measures and there is a significant difference ($p \leq .05$) on only one questionnaire item (quantity of ideas). Furthermore, the direction of that one difference is changed from the effect obtained after the first task. That is, the low feedback groups now rate themselves higher, which is inconsistent with an implicit theory explanation. And, in fact, this appears to be a correct perception, since observers indicated there was a greater frequency of attempted answers in the low feedback condition.

One other difference that was found is quite important. Perceived performance on task 2 was significantly different for the high and low feedback groups, while objective performance was not different. In fact, the low feedback groups actually perceived their performance to be even poorer on the second task than on the first, while the high feedback groups perceived their performance to be higher, even though no additional feedback was given. Thus, the feedback manipulation at time 1 actually got stronger by time 2, in spite of the subjects performing another task in the interim, yet there is no evidence of implicit theories operating at time 2.

In order to determine if there were changes between the responses given for the first and second questionnaires, a series of correlated t-tests was conducted, comparing means obtained after each task. It was necessary to divide the sample into four groups (high vs. low feedback

given before or after completing the questionnaire) to make these comparisons meaningful, because some subjects completed the first questionnaire with no feedback while everyone had received feedback before completing the second questionnaire. The results of these t-tests are presented in Table 3.

Table 3 Goes About Here

One point must be considered in judging these results. Observer ratings of both high and low feedback groups indicated a general decrease in all group interaction categories. That is, regardless of feedback condition or order of feedback, there were significant ($p \leq .05$) declines in three of the four observer Bales ratings (all except negative reactions) from time 1 to time 2. Thus, there seems to be evidence of a basic developmental process taking place within the groups, regardless of feedback condition.

With this in mind, the results presented in Table 3 are rather interesting. As can be seen, there is only one significant change for either set of low feedback groups from the first to the second task. Perceived motivation is significantly ($p \leq .05$) lower after the second task (than it was after the first task), only for those groups who received feedback before completing the time 1 questionnaire. There are no other significant changes for the low feedback groups except that perceived performance is significantly lower ($p \leq .01$) following the second task for groups who received feedback after completing the time 1 questionnaire. This change simply indicates that these subjects accepted the feedback given them at time 1 and made the downward adjustment in perceived performance on the next survey (at time 2). In general, subjects in the low feedback conditions failed to accurately report changes noted by raters, and the pattern of response changes from time 1 to time 2 does not support the operation of implicit theories at time

2 (especially for subjects given low feedback after the time 1 survey). Implicit theories would have dictated a decline in ratings for these subjects, and since there is no decline, what we may have is a feedback effect on actual interaction and performance. Indeed, performance significantly improved for the low feedback groups from task 1 to task 2.

The results in the high feedback conditions in Table 3 are more complex. For those groups receiving feedback before completing the time 1 questionnaire, subjects reported significant ($p \leq .05$) decreases from time 1 to time 2 in motivation, quantity of different ideas, and attributions to both self and group ability. In addition, perceived performance on the second task was significantly ($p \leq .01$) lower than perceived performance on the first task. Two points stand out concerning these results: they do not support the continued operation of implicit theories at time 2, and they seem to reflect a pessimism on the part of group members in terms of repeating their earlier success.

For those groups receiving feedback after completing the time 1 questionnaire, subjects report a significant ($p \leq .01$) decrease in task conflict, and a significant ($p \leq .05$) increase in attempted answers and questions asked -- both positive changes. In general, the trend is toward positive changes from time 1 to time 2 for these groups, although perceived performance does decline slightly. These results, then, do not reflect the changes reported by the observers, but they do support the operation of implicit theories. Indeed this support is especially apparent when we consider the decline in observer interaction ratings versus the increase in subject interaction ratings. The comparison of these ratings needs to be further explored, as in the following section.

Relationship Between Observer and Self-Reported Bales' Ratings

The final research question was concerned with the relationship between group interaction ratings obtained from the group members themselves, and those obtained from the independent observers. Some reference to these relationships has already been made. For example, at time 2, observers noted a general decline in interaction, while in some high feedback groups, subjects actually reported an increase in this interaction, supporting the operation of implicit theories. Stronger support for implicit theories, was also provided by a comparison of ratings at time 1 (see Table 1). Observers indicated greater incidence of attempted answers in the low feedback groups (6.11 vs. 5.78, $t = 2.20$, $p < .05$), and slightly greater incidence of questions asked (4.27 vs. 4.11, $t = .95$, n.s.), but, the subjects reported lower incidences of both these behaviors in the low feedback groups (5.32 vs. 5.72, $t = 2.00$, $p < .05$, and 4.61 vs. 5.13, $t = 1.94$, $p < .06$, respectively). Thus, in these two instances, subjects' responses were consistent with implicit theories even in the face of totally conflicting reality. It would seem that the strongest evidence for implicit theories would be their operation in this situation.

To determine how subjects did arrive at their ratings on both questionnaires, a series of hierarchical regression equations were constructed. Each equation considered one of the Bales ratings made by subjects at either time 1 or time 2 (i.e., 8 equations in total) as the dependent variable, and used the sign of the feedback (dummy coded) and the matching observer rating as the independent variables. In each case, the feedback variable was entered first in order to determine if the "real"

behavior ratings added a significant portion of explained variance over and above the feedback. Table 4 presents the results of the eight regression equations, including a test of the significance of increased variance explained (from Cohen & Cohen, 1975).

Table 4 Goes About Here

The results of the regression equations for time 1 ratings (which include only those people who received feedback before completing the surveys) are particularly interesting. Two of the overall regressions are significant (positive reactions and questions asked), and the feedback explains at least as much of the variance, as the observer ratings. There is also a significant effect for one of the interaction terms. When observer ratings are low for positive reactions, the sign of feedback has no effect on subject ratings, but when observer ratings are high, high task feedback results in higher subject ratings than does low feedback. If we consider the time 2 regressions, there are three of four which are significant (all except negative reactions), and the observer ratings are by far the most salient predictors of subject-reported interaction. Further, there are no significant interaction terms. What these results thus suggest is that strong feedback has an immediate impact on survey responses through implicit theories, here distorting the subjects' ability to assess actual interaction at time 1. But, this impact is very short-lived as new information becomes available on task 2. Indeed, the impact of the feedback has decreased substantially by the time 2 survey.

Another regression analysis of the impact of feedback on the ratings was also conducted. For each of the four Bales interaction categories, observer ratings and actual performance were entered first, followed by feedback to determine if feedback added a significant amount

of explained variance over and above the two objective pieces of information. For the first task, feedback added significant variance only for the "Questions Asked" category, and for the second task, feedback added significant variance for only the "Attempted Answers" category. Thus these results present very little evidence that implicit theories create any serious distortion of perceptions of group process.

Discussion

The results of the present study tend to support the concept of implicit theories of performance and their effect on survey responses, but the process by which they operate appears to be much more complex than past research has suggested. Implicit theories of performance seem to operate only under certain conditions and for limited periods of time.

As Binning and Lord (in press) suggest, only strong positive or negative feedback tends to cause subjects to utilize implicit theories of performance. The no feedback control groups for the first task were not meaningfully different from either the high or low feedback groups, and since many real groups are likely comparable to the no feedback groups, the concern for implicit theories may not need to be that great.

The greatest immediate and certainly the most sustained implicit theory impact on survey responses is for the high feedback condition. The high feedback groups perceived better group process on the first task than the no feedback and low feedback groups and continued to perceive better process for the second task as well, thus supporting an implicit theories interpretation. On the other hand the low feedback groups exhibited little implicit theories impact at any time. This finding is especially interesting given that the manipulation check for the first task indicated a greater difference between low and no feedback groups

than for the high and no feedback groups. Certainly then, the subjects perceived the low feedback, but it appears they chose to utilize the feedback to stimulate more positive behavior than was stimulated by the high feedback. This statement is supported by the fact that objective performance significantly improved from first to second task for the low feedback groups and was unchanged for the high feedback groups. These results suggest that the real impact of feedback deserves further research, just as does the perceived impact.

In terms of a lasting impact of feedback, these results suggest that there is little carry-over effect to ratings following a subsequent task, except in terms of perceived performance. Indeed, the manipulation checks held up for the second task, with no additional feedback given, thus reducing a concern expressed by Downey, et al. (1979) in studying implicit theories with time series designs. Further, it was noted that high feedback before the first survey produced significantly higher responses than did low feedback. However, for those groups receiving high feedback before the first survey, their responses significantly declined for the second task, and those receiving high feedback after the first survey increased their responses for survey two. These results suggest both an adjustment to the high feedback plus the immediacy of its impact.

Other results also suggest the immediacy of performance feedback impact. The regression results for the self-report Bales items suggest that the feedback altered subjects' perceptions of reality such that the correlation between subject-ratings and observer ratings was quite small. By the second task, however, the observer Bales ratings were by far the better predictor of self-report Bales ratings. It seems that

the effects of the feedback were quickly absorbed and reduced by actual experience, in spite of the fact that perceived performance remained higher on task 2 for the high versus low feedback groups. These results suggest that strong feedback, especially positive feedback can distort perceptions that are immediately requested, but when there is time between feedback and survey, the feedback does not invoke implicit theories of performance.

It should be noted that the explained variance tended to be small for all of the regressions, even though several of the regressions were significant. By adding the time 1 subject rating to each of the time 2 regressions, the explained variance was increased to .43, .25, .28, and .42, respectively. Thus, as one might expect, it is certain that past perceptions of interaction are salient predictors of current perceptions, and to the extent that past perceptions were affected by performance cues, current perceptions may be indirectly affected. This finding thus indicates some support for an implicit theories interpretation. Still, much work remains for researchers in understanding how perceptions of group interaction are formulated. What are the relative impacts of actual group process, actual performance, past perceptions, and performance feedback?

In conclusion then, implicit theories do appear to operate for a short time when the performance feedback is strong. However, when subjects have additional information subsequent to the feedback, they will rely on that information rather than the feedback. The question of history appears not so much to be a matter of time prior to feedback but rather meaningful time spent together after feedback.

As researchers, we need to avoid surveys immediately following performance reviews or other strong feedback in order to obtain unbiased surveys, but this condition would not appear that difficult to obtain. Thus, implicit theories may not be the problem suggested in earlier studies.

Footnotes

Requests for reprints should be addressed to:

W. Alan Randolph
College of Business Administration
University of South Carolina
Columbia, SC 29208

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TABLE 1
Mean Questionnaire Responses and Differences Between Groups
After First Task for Low, High and No Feedback Groups

Measures	Means			t Values		
	Low Feedback (n=38)	No Feedback (n=67)	High Feedback (n=38)	Low versus no feedback ^a	High versus no feedback ^b	Low versus high feedback ^b
Items replicating Staw:						
Motivation	6.13	6.10	6.34	-0.13	1.17	1.04
Influence of group	3.94	3.67	3.68	-1.12	0.06	-0.96
Influence of individual	3.42	3.40	3.50	-0.10	0.50	0.35
Quantity of different ideas	4.79	4.43	5.13	-1.34	2.63**	1.23
Openness to new ideas	5.23	5.24	5.42	0.01	0.95	0.80
Task conflict	2.36	2.40	2.34	0.15	-0.28	-0.11
Group process items:						
Feelings toward group members	5.38	5.46	5.41	0.45	-0.26	0.11
Interaction	5.31	5.51	5.63	1.40	0.78	1.91.06
Positive reactions	5.12	5.11	5.46	-0.02	1.19	1.46
Attempted answers	5.32	5.39	5.72	0.26	0.76	2.00*
Questions asked	4.61	4.86	5.13	1.02	0.76	1.94.06
Negative reactions	2.35	2.34	2.33	-0.01	-0.07	-0.08
Contributions to:						
Self ability	4.26	4.42	4.87	0.61	2.17*	2.34*
Group ability	5.50	5.75	6.13	0.83	1.66	2.26*
Self effort	4.55	4.45	4.68	-0.43	1.25	0.55
Group effort	5.36	5.69	6.00	1.00	1.29	2.00*
Luck	3.05	2.62	2.32	-1.19	-1.06	-2.03*
Nature of task	4.57	4.51	4.39	-0.26	-0.37	-0.61
Clarity of instructions	4.34	3.89	3.55	0.86	1.25	1.89
Observer ratings of interaction:						
Positive reactions	3.49	3.36	3.59	-0.70	1.20	0.44
Attempted answers	6.11	5.85	5.78	-2.12*	-0.47	-2.20*
Questions asked	4.27	4.27	4.11	0.01	-1.12	-0.95
Negative reactions	1.71	1.72	1.44	0.13	-2.38*	-2.02*
Perceived Performance	5.16	5.89	6.01	5.70***	2.26*	5.92***
Objective Performance	38.97	38.37	41.47	.57	1.71	1.08

Negative t values indicate lower mean ratings for no feedback groups.
Positive t values indicate lower mean ratings for high feedback groups.

* $p < .05$
* $p < .01$
* $p < .001$

Note: Standard deviations are not included for the sake of clarity. They are available from the first author upon request.

TABLE 2
Mean Questionnaire Responses and Differences Between Groups
After Second Task for Low and High Feedback Groups

Measures	Means ^a		t value ^b
	Low Feedback (n=70)	High Feedback (n=73)	
Items implicating Staw:			
1. Motivation	5.88	5.95	0.40
2. Influence of group	3.65	3.62	-0.16
3. Influence of individual	3.42	3.67	1.45
4. Quantity of different ideas	4.61	3.93	-2.92**
5. Openness to new ideas	5.45	5.14	-1.80
6. Task conflict	2.36	2.14	-1.30
Group process items:			
1. Feeling toward group members	5.56	5.42	-0.89
2. Interaction	5.40	5.41	0.07
3. Positive reactions	5.10	5.14	0.25
4. Attempted answers	5.36	5.59	1.63
5. Questions asked	4.96	4.97	0.06
6. Negative reactions	2.31	2.43	0.77
Attributions to:			
1. Self ability	4.51	4.44	-0.38
2. Group ability	5.68	5.69	0.06
3. Self effort	4.51	4.67	0.76
4. Group effort	5.51	5.86	1.40
5. Luck	2.91	2.45	-1.65
6. Nature of task	4.31	4.31	0.01
7. Clarity of instructions	3.83	4.11	0.92
Observer ratings:			
1. Positive reactions	3.20	2.95	-1.43
2. Attempted answers	5.25	5.13	-3.14**
3. Questions asked	3.63	3.64	0.12
4. Negative reactions	1.72	1.45	0.77
Perceived Performance	5.03	6.57	7.09***
Objective Performance	40.47	40.31	-0.24

^a These means are unadjusted for the responses after the first task.

^b Negative t values indicate lower mean ratings for high feedback groups.

* $p < .05$

** $p < .01$

*** $p < .001$

Note: Standard deviations are not included for the sake of clarity. They are available from the first author upon request.

TABLE 3

Pairwise Comparisons (t Values) of Survey Responses after First
Versus Second Tasks for Four Groups Formed by
Considering Order and Sign of Feedback^a

Measures	High Feedback		Low Feedback	
	Given Before First Survey	Given After First Survey	Given Before First Survey	Given After First Survey
Items replicating Staw:				
1. Motivation	-2.43*	-1.12	-2.45*	-0.75
2. Influence of group	-0.71	-0.66	-1.69	1.51
3. Influence of individual	1.16	1.77	0.01	0.01
4. Quantity of different ideas	-4.55***	-1.22	-1.44	-0.23
5. Openness to new ideas	-1.38	0.01	0.31	1.51
6. Task conflict	0.01	-3.19**	0.01	-0.14
Group Process Items:				
1. Feeling toward group members	-0.46	1.87	0.98	-0.26
2. Interaction	-1.57	-0.13	-0.12	-0.79
3. Positive reactions	-1.79	0.99	-1.55	0.01
4. Attempted answers	-0.91	2.20*	-1.08	-0.35
5. Questions asked	-1.17	2.05*	1.05	0.47
6. Negative reactions	0.95	-0.77	-0.14	0.66
Attributions to:				
1. Self ability	-2.32*	0.72	0.45	-0.35
2. Group ability	-2.40*	0.82	0.48	-1.48
3. Self effort	0.85	1.65	-0.83	-0.30
4. Group effort	0.15	0.79	0.11	-1.31
5. Luck	-0.77	0.57	-0.95	1.77
6. Nature of task	-0.38	-0.91	-1.48	-0.68
7. Clarity of instructions	0.29	1.25	0.90	-1.88
Perceived Performance	-3.10**	-0.42	-0.59	-4.31***

^aAll values in the table are t values. Negative t values indicate a lower rating after the second task (i.e., a decline in rating).

*p ≤ .05

**p ≤ .01

***p ≤ .001

Note: Means and standard deviations are not included for the sake of clarity. They are available from the first author upon request.

TABLE 4
Results of Hierarchical Regressions Predicting
Questionnaire Responses After
Tasks 1 and 2

Task 1	ΔR^2 for each variable ^a			Overall R^2
Questionnaire Category	Feedback	Observer	Interaction	
Positive Reactions	.04	.04	.05*	.13 ^b
Attempted Answers	.05	.01	.01	.07
Questions Asked	.09	.00	.03	.12 ^b
Negative Reactions	.00	.00	.00	.00

Task 2	ΔR^2 for each variable			Overall R^2
Questionnaire Category	Feedback	Observer	Interaction	
Positive Reactions	.00	.14**	.01	.15 ^b
Attempted Answers	.01	.11**	.01	.13 ^b
Questions Asked	.00	.08*	.00	.08 ^b
Negative Reactions	.00	.01	.02	.03

^aIndependent variables are presented in the order in which they entered the regression equation: sign of feedback, independent observer rating and an interaction term. Variables which resulted in a significant change in explained variance (using formula in Cohen & Cohen, 1975) are indicated as follows: * $p < .05$ ** $p < .01$

^bThese overall regressions with sign of feedback, independent observer rating and interaction term entered are significant at $p \leq .05$.